

# Towards a Metrics Based Verification and Validation Maturity Model (MB-V2M2)

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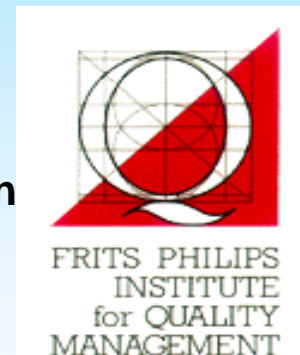
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# Overview

- **Backgrounds**
- **Objectives & Approach**
- **Concept & Definition**
- **Validation of the maturity model**
- **Current Status**

# Backgrounds (1)

- **Major High-Tech companies (in The Netherlands) confronted with:**
  - Explosive increase in complexity of systems
  - Strong demand for higher software quality
  - Market pressure for shorter development cycles
- **Consultancy & Service Agencies (in The Netherlands)**
  - Strong increase in (testing) consultancy
  - Growing demand for seminars, workshops, courses on Test Process Improvement and Test Methods

## Backgrounds (2)

- Despite improvement actions: Testing Process not experienced as efficient and effective
- Existing Testing Improvement Models/methods help (but only to a certain extent)
- No industry-wide acceptance of a particular Testing Improvement Model

(High-Tech) Companies and Consultancy/Service organisation in co-operation with an academic institute decided to join forces:

**Development of a Verification & Validation  
Maturity Model (V2M2)**

Subsidised by the Dutch Government, Ministry of Economic Affairs.

# **Objectives & Approach (1)**

## **Model Objectives**

- **Industry-wide recognition of the maturity model**
- **Unification/streamlining of V&V education & training**
- **Facilitation of exchange of V&V practitioners over companies**
- **Improved V&V effectiveness and efficiency**

## **Objectives & Approach (2)**

### **Model Requirements**

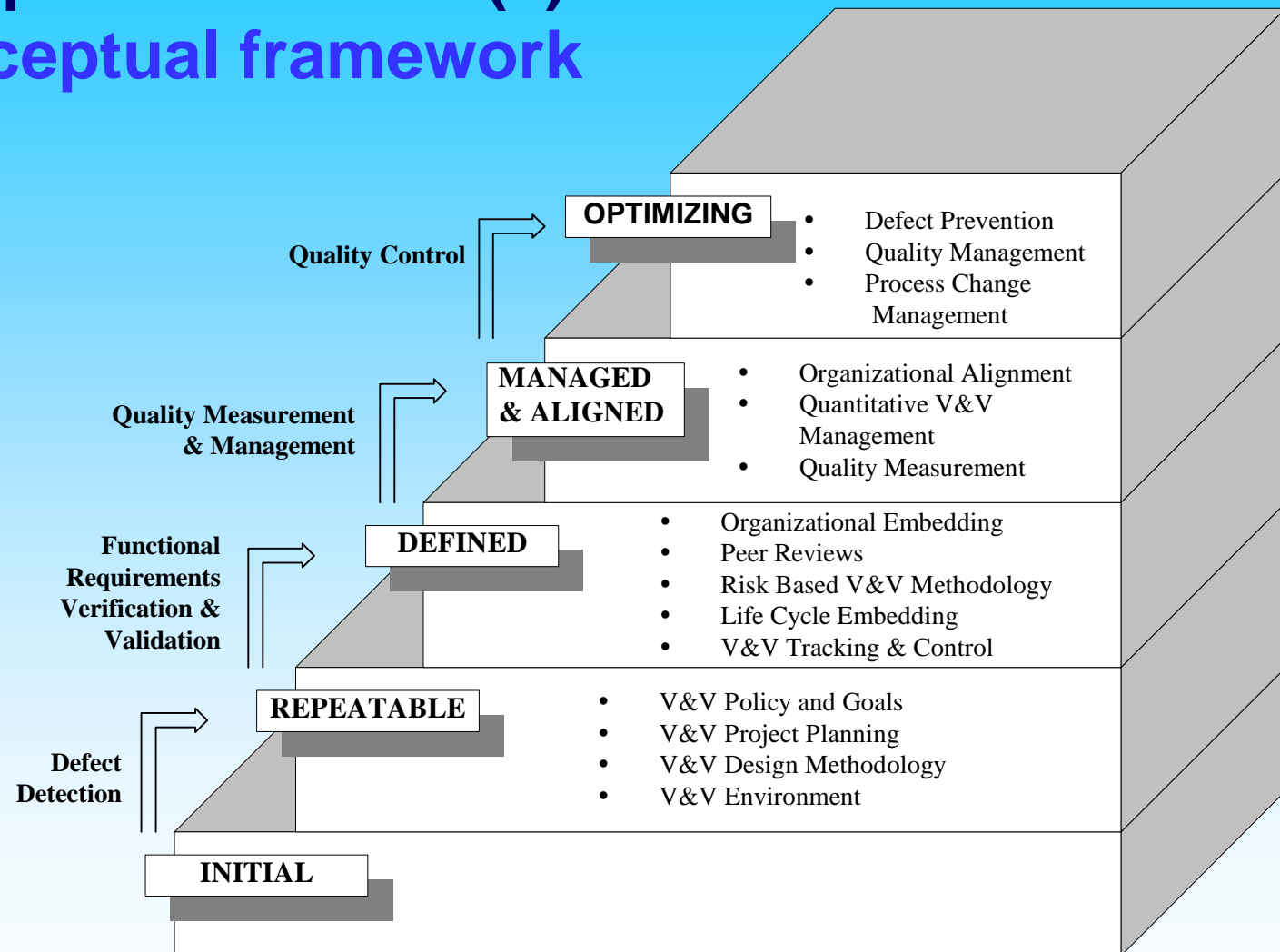
- **Defined V&V Maturity (levels)**
- **Specified Improvement Steps/Actions**
- **Operational assessment of V&V maturity**
- **Elaborated metrification (to show whether improvements are effective)**

# Concept & Definition (1)

- **Sources: Test Process Improvement and Development Improvement Models**
- **Concepts:**
  - Growth stages / Maturity levels,
  - V&V processes: well-defined process areas
  - Investigation of good practices
  - Assessment: checklist approaches:
  - Metrification: GQM procedures

# Concept & Definition (2)

## A conceptual framework





# Concept & Definition (3)

## Staged or Continuous ?

- **STAGED MODEL:**

- Different process area's addressed at different maturity levels
- Maturity grows in discrete steps

- **CONTINUOUS MODEL:**

- A process area is addressed at all maturity levels
- for all process area's, maturity grows simultaneously and smoothly

# Concept & Definition (4)

## Staged or Continuous ?

- **Staged nature:**

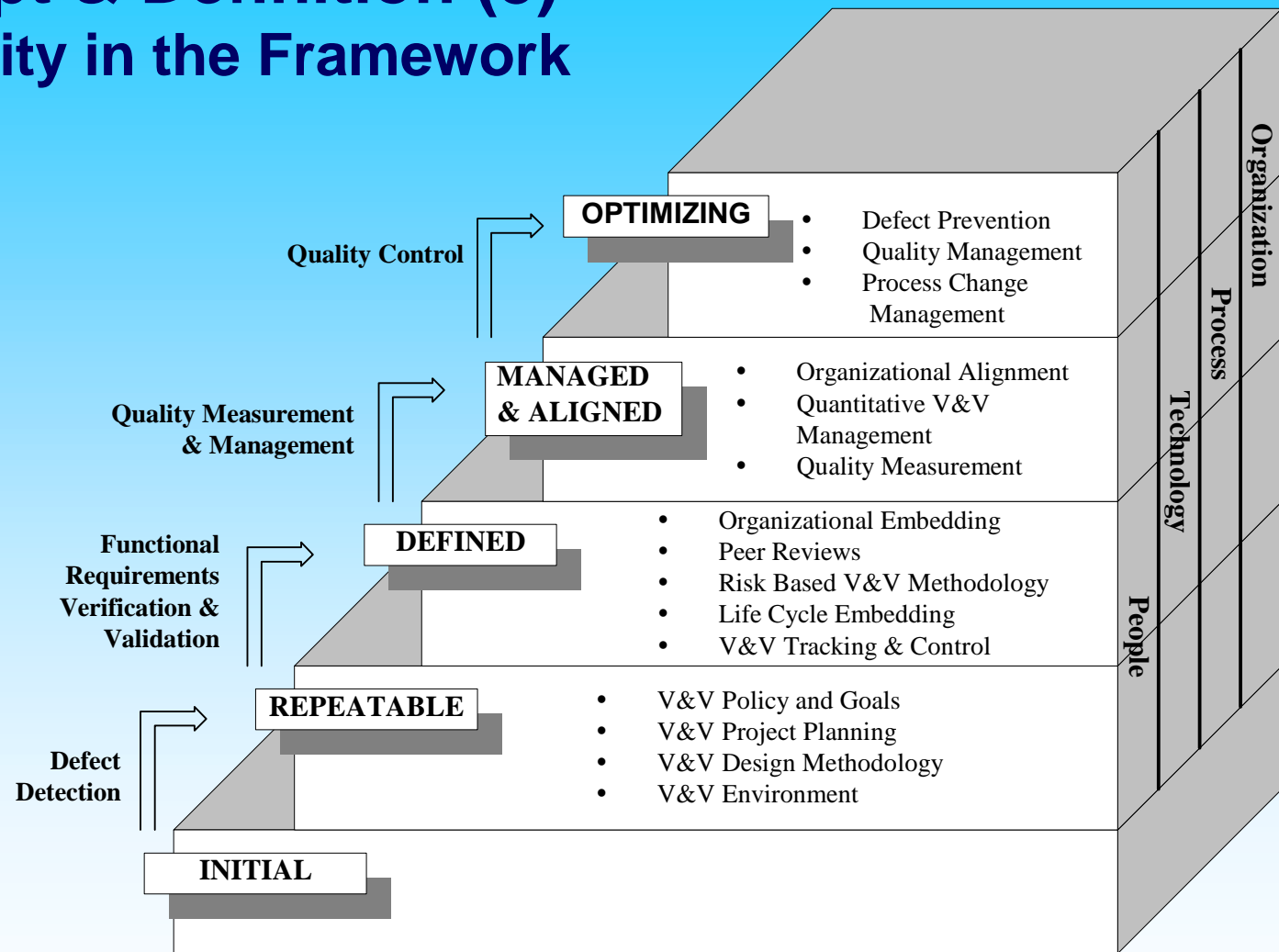
- Different process area's addressed at different maturity levels
- Maturity grows in discrete steps

- **Continuous nature:**

- At all maturity levels and for all process area's 'fundamental factors' are addressed and balanced
- Fundamental factors: People, Technology, Process, Organisation

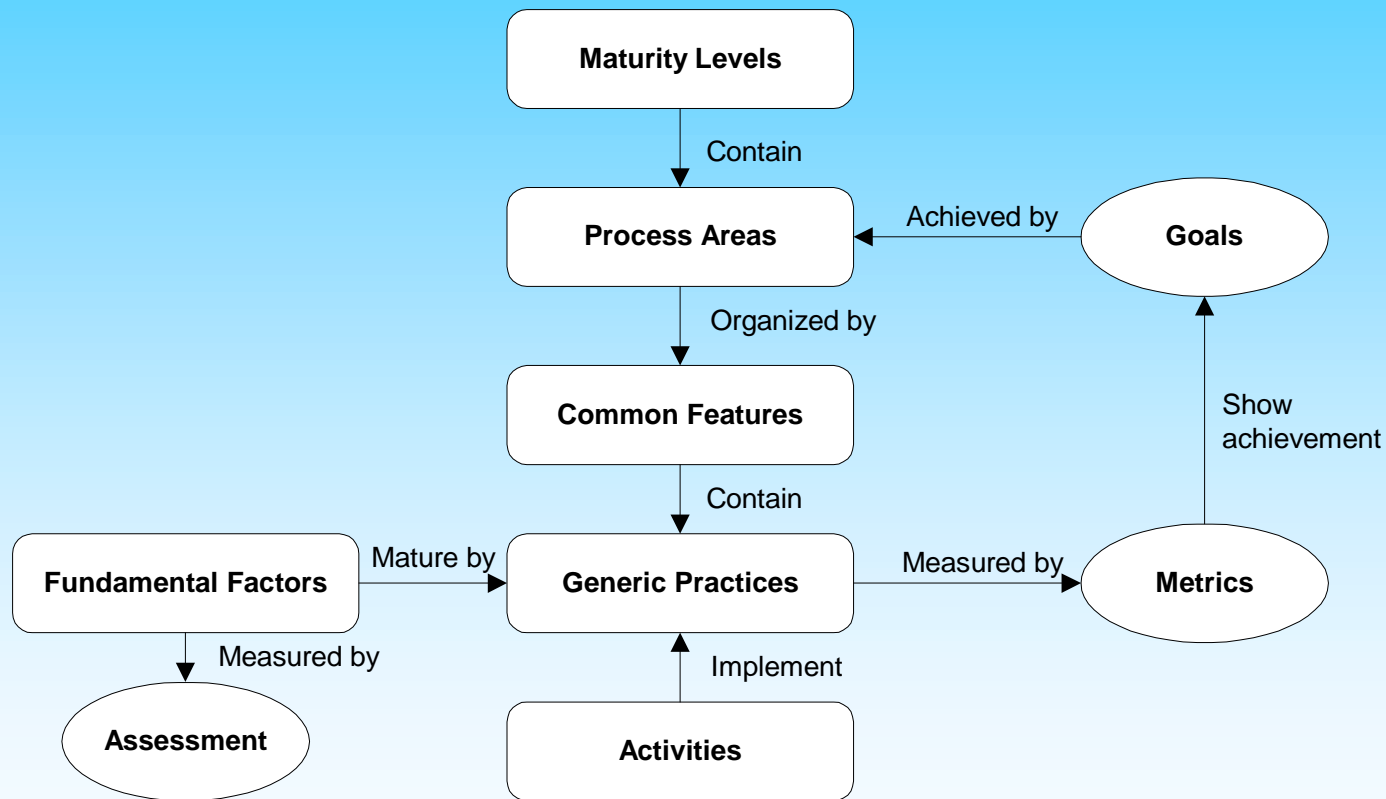
# Concept & Definition (5)

## Continuity in the Framework



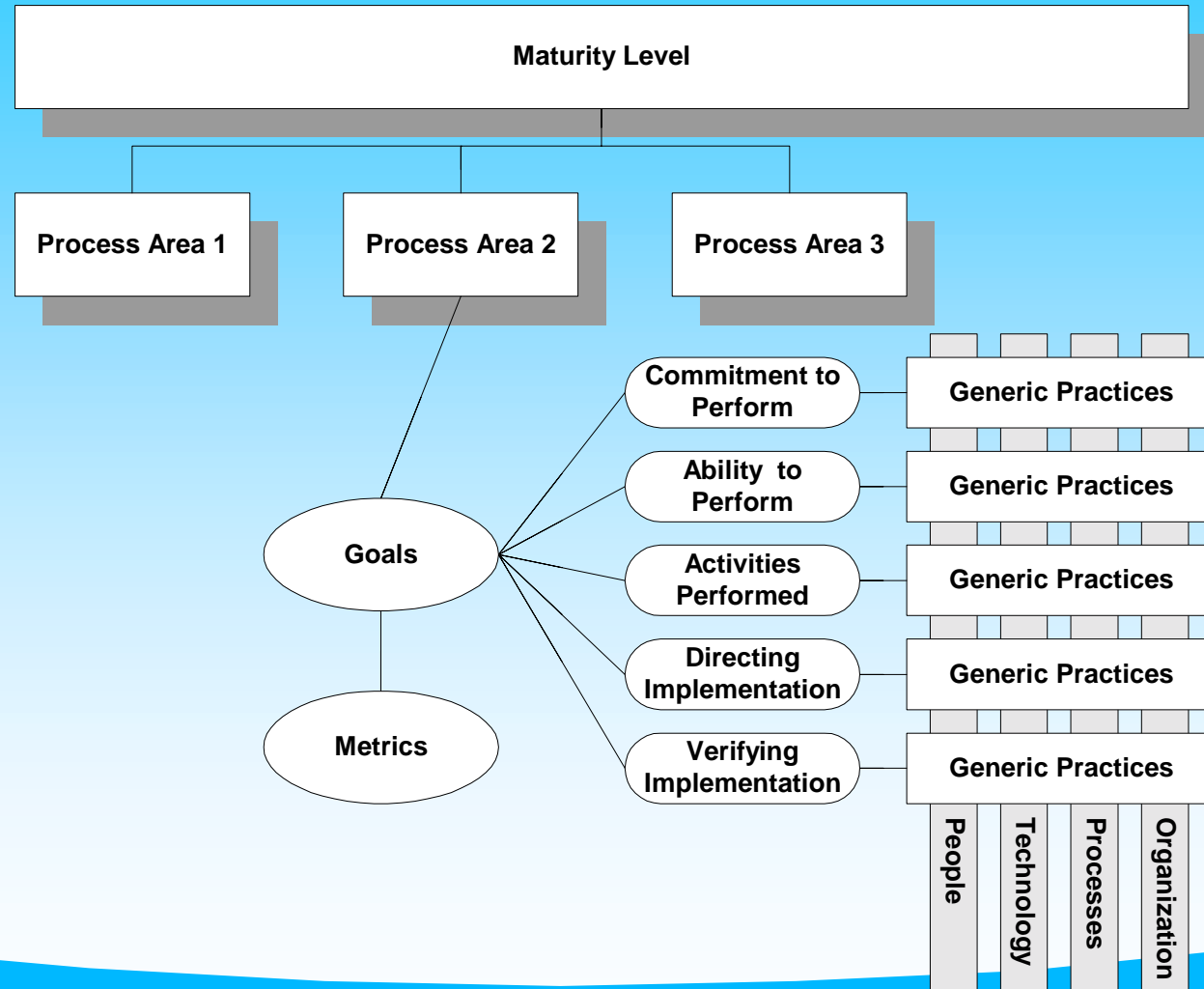
# Concept & Definition (6)

## Model Elements of MB-V2M2



# Concept & Definition (7)

## Structure of MB-V2M2



# Validation (1): Experiments and Case Studies

- **PA Peer Reviews**
  - Risk-based sampling of documents ⇒ Prioritise Inspection Effort
- **PA's V&V Tracking and Control /Design Methodology**
  - Quality of requirements: Intake of Requirements & Automated Requirements Measurement
- **PA V&V Policies and Goals**
  - Metrification: Lead time, Predictability, Quality of V&V
- **PA's Quality Measurement / Organisational Alignment**
  - Product Quality Profile to identify V&V objectives and strategy
- **PA V&V Environment**
  - V&V tool selection approach

# Validation (2): Control of improvements

## Metrification approach based on GQM

- **Deriving improvement goals from business goals and process goals**
  - Example: customer satisfaction – product quality improvement – product quality specification
- **Formulating questions to explore how goals can be reached**
  - Example: reduce defects by reviewing upper life cycle documents, invite customers to participate in the upper life cycle review process
- **Defining metrics**
  - Examples:
    - # defects found in upper versus lower life cycle documents, # reviews, effort, time
    - customer confidence estimation (based on interview/enquete)

# Current Status

## Progress

- **Conceptual Basis defined**
- **Model specified**
  - Framework & Structure
  - Process Areas up to level 4 defined
- **Instrumentation**
  - Assessment Procedure: in progress
  - Metrics Basis: in progress
- **Validation of the MB-V2M2**
  - Experiments & case studies done/in progress
- **Dissemination**
  - Quality Week 2001 , EuroStar 2001, SafeComp 2002, STEP 2002, Philips Software Conference 2002, .....



# Thank you for your attention

## To keep informed or to exchange ideas:

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